

08/414,415
APS (USPAT)

11-5-96

L1 121 S 526/147/CCLST
L2 12 S L1 AND METHYL ACRYLATE
L3 0 S L2 AND "CU(I)BR"
L4 0 S L2 AND "CU(I)"
L5 1 S L2 AND BIPYRIDINE
L6 1 S L1 AND BIPYRIDINE
L7 72 S DIBROMOXYLENE
L8 0 S L2 AND L7
L9 0 S L1 AND L7
L10 0 S L5 AND L7
L11 0 S L6 AND L7

=> d 15

1. 4,716,205, Dec. 29, 1987, Nickel-catalyzed polymerization of ethylene; Ulrich Klabunde, 526/115, 117, 118, 119, 121, 124.1, 124.2, 126, 127, 128, 135, 141, 142, 144, **147**, 149, 154, 155, 160, 161, 171, 352 [IMAGE AVAILABLE]

08/414,415
STN/CAS (CA)
11-6-96

=> s atom transfer radical polymerization

207788 ATOM
416982 TRANSFER
152211 RADICAL
163919 POLYMERIZATION

L1 12 ATOM TRANSFER RADICAL POLYMERIZATION

(ATOM (W) TRANSFER (W) RADICAL (W) POLYMERIZATION)

=> s group transfer radical polymerization

741444 GROUP
416982 TRANSFER
152211 RADICAL
163919 POLYMERIZATION

L2 0 GROUP TRANSFER RADICAL POLYMERIZATION

(GROUP (W) TRANSFER (W) RADICAL (W) POLYMERIZATION)

=> s l1 and methyl acrylate

414756 METHYL
95290 ACRYLATE
8628 METHYL ACRYLATE
(METHYL (W) ACRYLATE)

L3 4 L1 AND METHYL ACRYLATE

=> s l3 and "Cu(I)"

432409 "CU"
2559473 "I"
6463 "CU(I)"
("CU" (W) "I")

L4 1 L3 AND "CU(I)"

=> d l4 bib abs

L4 ANSWER 1 OF 1 CA COPYRIGHT 1996 ACS

AN 123:257535 CA

TI Controlled/"Living" Radical Polymerization. Halogen Atom Transfer Radical Polymerization Promoted

by a Cu(I)/Cu(II) Redox Process

AU Wang, Jin-Shan; Matyjaszewski, Krzysztof

CS Department of Chemistry, Carnegie-Mellon University, Pittsburgh, PA, 15213, USA

SO Macromolecules (1995), 28(23), 7901-10
CODEN: MAMOBX; ISSN: 0024-9297

DT Journal

LA English

OS CJACS

AB An extension of atom transfer radical addn., ATRA, to atom transfer radical polymn., ATRP, provided a new and efficient way to conduct controlled/. By using a simple alkyl halide, R-X (X = Cl and Br), as an initiator and a transition metal species complexed by suitable ligand(s), Mtn/Lx, e.g., CuX/2,2'-bipyridine, as a catalyst, ATRP of vinyl monomers such as styrenes and (meth)acrylates proceeded in a living fashion, yielding polymers with d.p. predtd. by $\Delta [M]/[I]_0$ up to Mn apprxeq. 105 and low polydispersities, $1.1 < M_w/M_n < 1.5$. The participation of free radical intermediates was supported by anal. of the end groups and the stereochem. of the polymn. The general principle and the mechanism of ATRP are elucidated. Various factors affecting the ATRP process are discussed.

=> d his

(FILE 'HOME' ENTERED AT 09:24:49 ON 06 NOV 96)
SET PAGELENGTH SCROLL

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L1 12 S ATOM TRANSFER RADICAL POLYMERIZATION
L2 0 S GROUP TRANSFER RADICAL POLYMERIZATION
L3 4 S L1 AND METHYL ACRYLATE
L4 1 S L3 AND "CU(I)"

=> d 13 bib abs 1-4

L3 ANSWER 1 OF 4 CA COPYRIGHT 1996 ACS
AN 125:248559 CA
TI Kinetic studies of atom transfer radical
polymerization of methyl acrylate
AU Paik, Hyun-jong; Matyjaszewski, Krzysztof
CS Department of Chemistry, Carnegie Mellon University, Pittsburgh, PA,
15213, USA
SO Polym. Prepr. (Am. Chem. Soc., Div. Polym. Chem.) (1996), 37(2),
274-275
CODEN: ACPPAY; ISSN: 0032-3934
DT Journal
LA English
AB Kinetic studies of the polymn. of Me acrylate with a homogeneous and
heterogeneous catalytic system are described and related to the
evolution of mol. wts. and polydispersities with conversion.

L3 ANSWER 2 OF 4 CA COPYRIGHT 1996 ACS
AN 123:257535 CA

TI Controlled/"Living" Radical Polymerization. Halogen Atom Transfer Radical Polymerization Promoted by a Cu(I)/Cu(II) Redox Process
AU Wang, Jin-Shan; Matyjaszewski, Krzysztof
CS Department of Chemistry, Carnegie-Mellon University, Pittsburgh, PA, 15213, USA
SO Macromolecules (1995), 28(23), 7901-10
CODEN: MAMOBX; ISSN: 0024-9297
DT Journal
LA English
OS CJACS
AB An extension of atom transfer radical addn., ATRA, to atom transfer radical polymn., ATRP, provided a new and efficient way to conduct controlled/. By using a simple alkyl halide, R-X (X = Cl and Br), as an initiator and a transition metal species complexed by suitable ligand(s), Mtn/Lx, e.g., CuX/2,2'-bipyridine, as a catalyst, ATRP of vinyl monomers such as styrenes and (meth)acrylates proceeded in a living fashion, yielding polymers with d.p. predtd. by $\Delta [M]/[I]^0$ up to Mn apprxeq. 105 and low polydispersities, $1.1 < M_w/M_n < 1.5$. The participation of free radical intermediates was supported by anal. of the end groups and the stereochem. of the polymn. The general principle and the mechanism of ATRP are elucidated. Various factors affecting the ATRP process are discussed.

L3 ANSWER 3 OF 4 CA COPYRIGHT 1996 ACS
AN 123:229035 CA
TI "Living"/Controlled Radical Polymerization. Transition-Metal-Catalyzed Atom Transfer Radical Polymerization in the Presence of a Conventional Radical Initiator
AU Wang, Jin-Shan; Matyjaszewski, Krzysztof
CS Department of Chemistry, Carnegie-Mellon University, Pittsburgh, PA, 15213, USA
SO Macromolecules (1995), 28(22), 7572-3
CODEN: MAMOBX; ISSN: 0024-9297
DT Journal
LA English
OS CJACS
AB A novel type of atom transfer radical polymn., ATRP, initiated with AIBN/cuIICl₂/bpy affords the bulk polymn. of styrene at 130.degree. in a "living"/controlled manner, similar to the one with R-X/CuI/bpy reported earlier. Moreover, a "living"/controlled ATRP of Me acrylate at 130.degree. was accomplished, when a catalytic amt. of AIBN (1% molar equiv.) was combined with 2-chloropropionitrile

(initiator) in the presence of bpy/CuIICl2.

L3 ANSWER 4 OF 4 CA COPYRIGHT 1996 ACS
AN 122:315212 CA
TI Controlled/"living" radical polymerization. atom transfer radical polymerization in the presence of transition-metal complexes
AU Wang, Jin-Shan; Matyjaszewski, Krzysztof
CS Department of Chemistry, Carnegie-Mellon University, Pittsburgh, PA, 15213, USA
SO J. Am. Chem. Soc. (1995), 117(20), 5614-15
CODEN: JACSAT; ISSN: 0002-7863
DT Journal
LA English
OS CJACS-IMAGE; CJACS
AB Atom transfer radical polymn. of styrene and Me acrylate is investigated using 1-phenylethyl chloride as a chlorine atom transfer precursor (initiator) and CuCl₂/2,2'-bipyridine complex as a chlorine atom transfer promoter (catalyst). The "living" radical polymn. of styrene alone generates polymers with predtd. mol. wt. up to Mn .apprxeq. 105 and with narrow mol. wt. distribution. Block copolymers of styrene and Me acrylate are also synthesized using the same technique.

=> d 11 bib abs 1-12

L1 ANSWER 1 OF 12 CA COPYRIGHT 1996 ACS
AN 125:248559 CA
TI Kinetic studies of atom transfer radical polymerization of methyl acrylate
AU Paik, Hyun-jong; Matyjaszewski, Krzysztof
CS Department of Chemistry, Carnegie Mellon University, Pittsburgh, PA, 15213, USA
SO Polym. Prepr. (Am. Chem. Soc., Div. Polym. Chem.) (1996), 37(2), 274-275
CODEN: ACPPAY; ISSN: 0032-3934
DT Journal
LA English
AB Kinetic studies of the polymn. of Me acrylate with a homogeneous and heterogeneous catalytic system are described and related to the evolution of mol. wts. and polydispersities with conversion.

L1 ANSWER 2 OF 12 CA COPYRIGHT 1996 ACS
AN 125:222588 CA
TI Branched and hyperbranched macromolecules by atom

transfer radical polymerization

AU Gaynor, Scott G.; Edelman, Shane Z.; Kulfan, Anthony; Matyjaszewski, Krzysztof

CS Department of Chemistry, Carnegie Mellon University, Pittsburgh, PA, 15213, USA

SO Polym. Prepr. (Am. Chem. Soc., Div. Polym. Chem.) (1996), 37(2), 413-414

CODEN: ACPPAY; ISSN: 0032-3934

DT Journal

LA English

AB Homopolymer. of p-chlorostyrene (I) in the presence of CuCl and 2,2'-bipyridyl gave hyperbranched polystyrene, which could copolymer. with Bu acrylate to grow linear chains off the hyperbranched macromol. The prepn. of branched polymers was demonstrated by copolymer. of I with styrene and with Me methacrylate.

L1 ANSWER 3 OF 12 CA COPYRIGHT 1996 ACS

AN 125:222540 CA

TI Kinetic investigation of the atom transfer radical polymerization of styrene in homogeneous systems

AU Xia, Jianhui; Matyjaszewski, Krzysztof

CS Department of Chemistry, Carnegie Mellon University, Pittsburgh, PA, 15213, USA

SO Polym. Prepr. (Am. Chem. Soc., Div. Polym. Chem.) (1996), 37(2), 513-514

CODEN: ACPPAY; ISSN: 0032-3934

DT Journal

LA English

AB The kinetics of atom transfer radical polymer. of styrene under homogeneous conditions was investigated.

L1 ANSWER 4 OF 12 CA COPYRIGHT 1996 ACS

AN 125:222482 CA

TI Principle and feature of atom transfer radical polymerization

AU Luo, Ning; Ying, Shengkang

CS Inst. of Material Sci. and Eng., East China Univ. of Sci. and Technol., Shanghai, 200237, Peop. Rep. China

SO Hecheng Xiangjiao Gongye (1996), 19(5), 299-302

CODEN: HXGOEA; ISSN: 1000-1255

DT Journal; General Review

LA Chinese

AB A review with 12 refs. on principle, classification, feature, and application of atom transfer radical polymer.

L1 ANSWER 5 OF 12 CA COPYRIGHT 1996 ACS
AN 124:344280 CA
TI Polymers with very low polydispersities from atom transfer radical polymerization
AU Patten, Timothy E.; Xia, Jianhui; Abernathy, Teresa; Matyjaszewski, Krzysztof
CS Dep. Chem., Carnegie Mellon Univ., Pittsburgh, PA, 15213, USA
SO Science (Washington, D. C.) (1996), 272(5263), 866-868
CODEN: SCIEAS; ISSN: 0036-8075
DT Journal
LA English
AB A radical polymn. process that yields well-defined polymers normally obtained only through anionic polymn. is reported. Atom transfer radical polymn. of styrene was conducted with several solubilizing ligands for the copper(I) halides: 4,4'-di-tert-Bu-, 4,4'-di-n-heptyl-, and 4,4'-di-(5-nonyl)-2,2'-dipyridyl. The resulting polymns. have all of the characteristics of a living polymn. and displayed linear semilogarithmic kinetic plots, a linear correlation between the no.-av. mol. wt. and the monomer conversion, and low polydispersity (ratio of the wt.-av. to no.-av. mol. wts. of 1.04 to 1.05). Similar results were obtained for the polymn. of acrylates.

L1 ANSWER 6 OF 12 CA COPYRIGHT 1996 ACS
AN 124:318011 CA
TI Radical polymerization yielding polymers with $M_w/M_n \approx 1.05$ by homogeneous atom transfer radical polymerization
AU Patten, Timothy E.; Xia, Jianhui; Abernathy, Teresa; Matyjaszewski, Krzysztof
CS Department Chemistry, Carnegie Mellon University, Pittsburgh, PA, 15213, USA
SO Polym. Prepr. (Am. Chem. Soc., Div. Polym. Chem.) (1996), 37(1), 575-6
CODEN: ACPPAY; ISSN: 0032-3934
DT Journal
LA English
AB Radical polymn. processes can yield well-defined polymers that heretofore could only be obtained through anionic polymns. The ATRP [atom transfer radical polymn.] technique involves [2,2'-bipyridyl] ligands that solubilize copper halides in the polymn. medium, and yields polymers with polydispersity of 1.05 or less, while maintaining the living nature of the polymn. In a typical ATRP of styrene, either 1-phenylethyl chloride or bromide is used as

initiator, and a mixt. of CuCl or CuBr and 2,2'-bipyridyl is the catalyst. The solv. of the Cu halide was enhanced when 4,4'-alkyl substituted bipyridyls were used. Thus with ATRP, radical polymn. can be used in the design and prepn. of well-defined materials and structurally complex macromols.

L1 ANSWER 7 OF 12 CA COPYRIGHT 1996 ACS
AN 124:317996 CA
TI From hyperbranched to crosslinked polymers by atom transfer radical polymerization
AU Gaynor, Scott G.; Edelman, Shane Z.; Matyjaszewski, Krzysztof
CS Mellon Institute, Carnegie Mellon University, Pittsburgh, PA, 15213, USA
SO Polym. Mater. Sci. Eng. (1996), 74, 236-7
CODEN: PMSEDG; ISSN: 0743-0515
DT Journal
LA English
AB Branched and hyperbranched polymers were prepd. by atom transfer radical polymn. The hyperbranched polymer was prepd. by homopolymn. of an AB₂-type monomer (with 2 functional groups), such as p-chloromethylstyrene (I) in the presence of Cu(I) initiator. The branched polymer was prepd. by copolymn. of I with styrene under the same conditions. Formation of crosslinked gels occurred when either of the polymns. was carried out for long periods of time. The living nature of the polymn. is discussed, and some characteristics of the polymers are given.

L1 ANSWER 8 OF 12 CA COPYRIGHT 1996 ACS
AN 124:87826 CA
TI Atom transfer radical polymerization (ATRP): A new approach towards well-defined (co)polymers
AU Wang, Jin-Shan; Greszta, Dorota; Matyjaszewski, Krzysztof
CS Department Chemistry, Carnegie Mellon University, Pittsburgh, PA, 15213, USA
SO Polym. Mater. Sci. Eng. (1995), 73, 416-17
CODEN: PMSEDG; ISSN: 0743-0515
DT Journal; General Review
LA English
AB A review with 8 refs. on the use of ATRP to produce well-defined polymers.

L1 ANSWER 9 OF 12 CA COPYRIGHT 1996 ACS
AN 124:87825 CA
TI Transition metal catalyzed atom transfer

radical polymerization (ATRP): Principle and mechanism

AU Wang, Jin-Shan; Matyjaszewski, Krzysztof
CS Mellon Institute, Carnegie Mellon University, Pittsburgh, PA, 15213,
USA
SO Polym. Mater. Sci. Eng. (1995), 73, 414-15
CODEN: PMSEDG; ISSN: 0743-0515
DT Journal; General Review
LA English
AB A review with 11 refs. on the principles and mechanism of ATRP.

L1 ANSWER 10 OF 12 CA COPYRIGHT 1996 ACS
AN 123:257535 CA

TI Controlled/"Living" Radical Polymerization. Halogen Atom Transfer Radical Polymerization Promoted by a Cu(I)/Cu(II) Redox Process

AU Wang, Jin-Shan; Matyjaszewski, Krzysztof
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15213, USA

SO Macromolecules (1995), 28(23), 7901-10
CODEN: MAMOBX; ISSN: 0024-9297

DT Journal

LA English

OS CJACS

AB An extension of atom transfer radical addn., ATRA, to atom transfer radical polymn., ATRP, provided a new and efficient way to conduct controlled/. By using a simple alkyl halide, R-X (X = Cl and Br), as an initiator and a transition metal species complexed by suitable ligand(s), Mtn/Lx, e.g., CuX/2,2'-bipyridine, as a catalyst, ATRP of vinyl monomers such as styrenes and (meth)acrylates proceeded in a living fashion, yielding polymers with d.p. predtd. by $\Delta [M]/[I]_0$ up to Mn .apprxeq. 105 and low polydispersities, 1.1 < Mw/Mn < 1.5. The participation of free radical intermediates was supported by anal. of the end groups and the stereochem. of the polymn. The general principle and the mechanism of ATRP are elucidated. Various factors affecting the ATRP process are discussed.

L1 ANSWER 11 OF 12 CA COPYRIGHT 1996 ACS
AN 123:229035 CA

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SO Macromolecules (1995), 28(22), 7572-3
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DT Journal

LA English

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AB A novel type of atom transfer radical polymn., ATRP, initiated with AIBN/CuIICl₂/bpy affords the bulk polymn. of styrene at 130.degree. in a "living"/controlled manner, similar to the one with R-X/CuI/bpy reported earlier. Moreover, a "living"/controlled ATRP of Me acrylate at 130.degree. was accomplished, when a catalytic amt. of AIBN (1% molar equiv.) was combined with 2-chloropropionitrile (initiator) in the presence of bpy/CuIICl₂.

L1 ANSWER 12 OF 12 CA COPYRIGHT 1996 ACS

AN 122:315212 CA

TI Controlled/"living" radical polymerization. atom transfer radical polymerization in the presence of transition-metal complexes

AU Wang, Jin-Shan; Matyjaszewski, Krzysztof

CS Department of Chemistry, Carnegie-Mellon University, Pittsburgh, PA, 15213, USA

SO J. Am. Chem. Soc. (1995), 117(20), 5614-15
CODEN: JACSAT; ISSN: 0002-7863

DT Journal

LA English

OS CJACS-IMAGE; CJACS

AB Atom transfer radical polymn. of styrene and Me acrylate is investigated using 1-phenylethyl chloride as a chlorine atom transfer precursor (initiator) and CuCl/2,2'-bipyridine complex as a chlorine atom transfer promoter (catalyst). The "living" radical polymn. of styrene alone generates polymers with predetd. mol. wt. up to Mn .apprxeq. 105 and with narrow mol. wt. distribution. Block copolymers of styrene and Me acrylate are also synthesized using the same technique.